

STUDIES ON SEASONAL FLUCTUATION OF EXCHANGEABLE CATIONS IN A LOAMY SAND SOIL OF A COCONUT PLANTATION

D.Giritharan, L.L.W.Somasiri and B.S.V.J.Perera

Soils and Plant Nutrition Division, Coconut Research Institute
Lunuwila, Sri Lanka

ABSTRACT

The seasonal changes in the nutrient status of a loamy sand soil (*ferralic arenosols*) and its effect on coconut palms was studied by leaf and soil analysis data obtained from an on-going field experiment consisting of 18 Tall x Tall palms of 40 years age in the agro-ecological region IL₃. Prior to commencement of the experiment each palm received to its manure circle, 3kg of NPK fertilizer known as Adult Palm Mixture (APM) and 1kg of dolomite annually. After commencement of experiment, application of dolomite was suspended and 3kg of APM per palm was applied and fluctuation of exchangeable cations in the soil throughout the 12 months period was examined by 1 M ammonium acetate extraction. In the top soil, the seasonal change of exchangeable K, Mg, Ca and Na was significant ($P < 0.01$), whereas in the subsoil, that of only exchangeable K and Ca was significant ($P < 0.01$). During Maha season rains, diffusion of K^+ to the water table was greater than that of Mg^{2+} and Ca^{2+} resulting in decrease of exchangeable K in soil water. Analysis of soil showed that exchangeable K in the soil increased by 0.21 meq/100g soils followed by a decrease upto the original status in 9 months and a significant decrease ($P < 0.01$) of exchangeable Ca and Mg were also observed 2 months after application of fertilizers. Six months later soil K decreased by 22% while the calcium and magnesium increased by 39% and 11% respectively (with reference to soils of two months after application). A negative linear relationship between K and Mg in the soil was also found ($r = 0.987$, $P < 0.01$). Analysis of the 14th leaf of the coconut palm showed deficiency for leaf Mg levels (0.18% in dry matter) while the leaf K was found to be sufficient (1.44% in dry matter). The study shows that application of K fertilizer enriches the exchangeable K pool in the soil for a short period and results in the decrease of both exchangeable Ca and Mg.

Key words: coconut, manure circle, magnesium, potassium, soil, fertilizer.